Date of Issue:
14 May 2014

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

RM Number: 8556
RM Name: NBS 123 (Sulfur Isotopes in Sphalerite)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Reference Material (RM) is intended for use in developing and validating methods for measuring relative differences in sulfur (S) isotope-number ratios, $R(^{34}S/^{32}S)$. The equivalent name for this RM as used by the International Atomic Energy Agency (IAEA) and the U.S. Geological Survey (USGS) is NBS123. A unit of RM 8556 consists of one bottle containing approximately 0.5 g of sphalerite (ZnS).

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
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FAX: 301-948-3730
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Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements
Symbol
No symbol/No pictogram

Signal Word
No signal word

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Sphalerite

Other Designations: alpha-zinc sulfide; zinc monosulfide; albalith; C.I. Pigment white 7; itran 2; sachtolith HD-S; ZnS

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Zinc sulfide	1314-98-3	215-251-3	100

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. Thoroughly clean and dry contaminated clothing before reuse.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

Most Important Symptoms/Effects, Acute and Delayed: May irritate the respiratory tract and skin.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, water, regular foam.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal.

7. Handling and Storage

Safe Handling Precautions: Minimize dust generation. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handling in accordance with all current regulations and standards. Keep separated from incompatible substances (halogens).

8. Exposure Controls and Personal Protection

Exposure Limits

NIOSH (REL): 10 mg/m^3 (TWA, total dust)
5 mg/m^3 (TWA, respirable dust)

OSHA (PEL): For Particulates Not Otherwise Regulated
15 mg/m^3 (TWA, total particulates)
5 mg/m^3 (TWA, respirable particulates)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties	**Zinc Sulfide**
Appearance (physical state, color, etc.)	gray or yellow crystals
Molecular Formula	ZnS
Molar Mass (g/mol)	97.43
Odor	not available
Odor threshold	not available
pH (solution)	not available
Evaporation rate	not available
Melting point/freezing point	1700 ºC (3092 ºF) at 38 000 mmHg Sublimation point: 1185 ºC (2165 ºF)
Specific Gravity (water = 1)	3.98
Vapor Pressure (mmHg)	not available
Vapor Density (air = 1)	not available
Viscosity (cP)	not available
Solubility(ies)	water: 0.000 69 %; soluble: dilute mineral acids; insoluble: acetic acid.
Partition coefficient (n-octanol/water)	not available
Particle Size (if relevant)	not available
Thermal Stability Properties	
Autoignition Temperature (ºC)	not available
Thermal Decomposition (ºC)	not available
Initial boiling point and boiling range	not available
Explosive Limits, LEL (Volume %)	not available
Explosive Limits, UEL (Volume %)	not available
Flash Point (ºC)	not available
Flammability (solid, gas)	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition; avoid contact with incompatible materials.

Incompatible Materials: Halogens.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of zinc and sulfur

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: May irritate the skin and respiratory tract.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Irritation of mucous membranes, nausea, vomiting, diarrhea, hypotension, pulmonary edema, dizziness, palpitations, convulsions and respiratory failure may occur for zinc salts and sulfides.

Skin Contact: Papulovesicular lesions and green discoloration of skin.

Eye Contact: May cause conjunctivitis.

Ingestion: May cause pain in mouth, vomiting, diarrhea, constipation, and stomach pain.

Numerical Measures of Toxicity

Acute Toxicity: Not classified.
Rat, Oral LD50: >2 g/kg
Rat, Inhalation LC50: >5040 mg/m^3 (4 h)
Rat, Dermal LD50: >2 g/kg

Skin Corrosion/Irritation: Not classified.

Serious Eye damage/Eye irritation: Not classified.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.
Listed as a Carcinogen/Potential Carcinogen _____ Yes __X__ No
Zinc sulfide is not listed by IARC, NTP or OSHA as a carcinogen/potential carcinogen.

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:
Fish: Fathead minnow (*Pimephales promelas*) LC50: 1826 mg/L (96 h) static
Invertebrate: Water flea (*Daphnia magna*) LC50: 970 mg/L (48 h) static

Persistence and Degradability: No data available.

Bioaccumulative Potential: No bioaccumulation.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.
SARA Title III Section 302 (40 CFR 355.30): Not regulated.
SARA Title III Section 304 (40 CFR 355.40): Not regulated.
SARA Title III Section 313 (40 CFR 372.65): 1 % de minimis concentration (related to zinc compounds).
OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No
CHRONIC HEALTH:	No
FIRE:	No
REACTIVE:	No
PRESSURE:	No

State Regulations:

California Proposition 65: Not listed.

U.S. TSCA Inventory: Listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 14 May 2014

Sources: ChemAdvisor, Inc., MSDS *Zinc Sulfide*, 21 March 2014.

Center for Disease Control (CDC), NIOSH Pocket Guide to Chemical Hazards, *Particulates Not Otherwise Regulated*, 04 April 2011; available at http://www.cdc.gov/niosh/npg/npgd0480.html (accessed May 2014).

National Library of Medicine, Hazardous Substance Data Bank (HSDB); *Zinc sulfide*; available at http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~BwEb6l:6 (accessed May 2014).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NIOSH	National Institute for Occupational Safety and Health
ALI	Annual Limit on Intake	NIST	National Institute of Standards and Technology
CAS	Chemical Abstracts Service	NRC	Nuclear Regulatory Commission
CEN	European Committee for Standardization	NTP	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	OSHA	Occupational Safety and Health Administration
CFR	Code of Federal Regulations	PEL	Permissible Exposure Limit
CPSU	Coal Mine Dust Personal Sample Unit	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
ISO	International Organization for Standardization	STEL	Short Term Exposure Limit
LC50	Lethal Concentration, 50 %	TDLo	Toxic Dose Low
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The reference values for this material are given in the NIST Report of Investigation.

Users of this RM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.